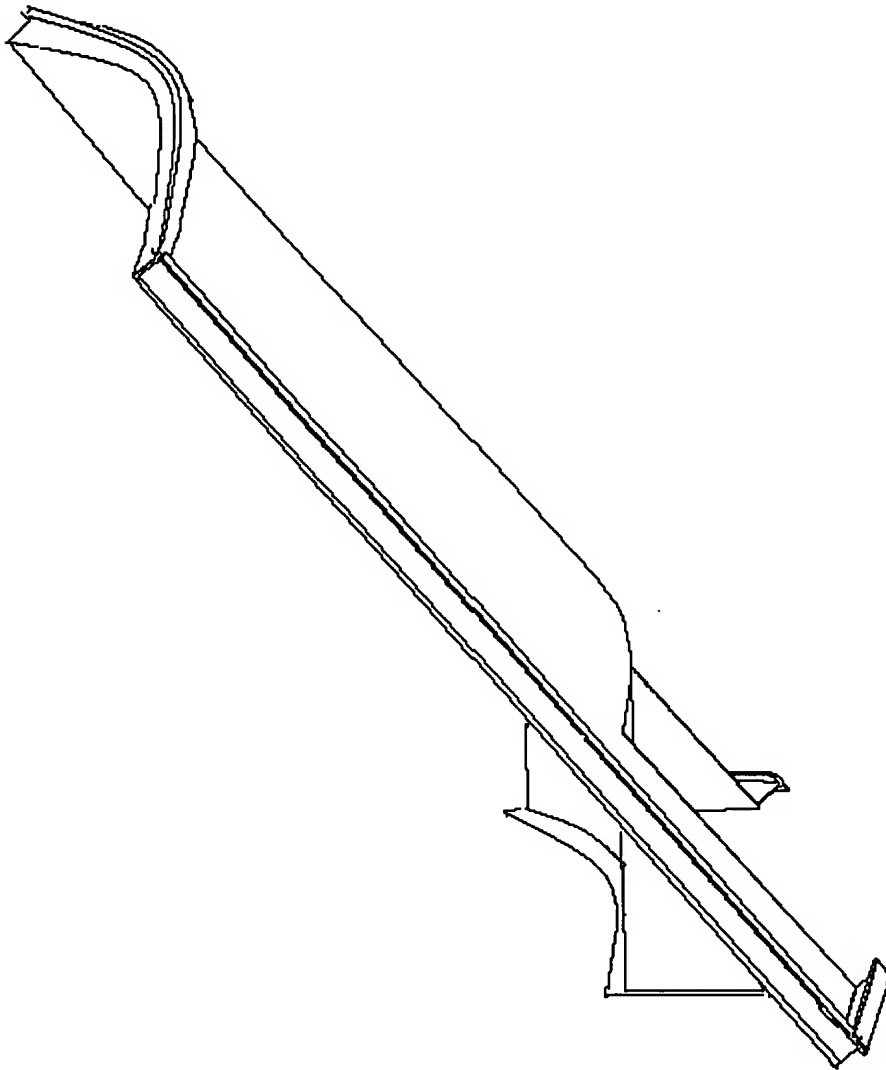


WINDSHIELD HEATING AIR APPLIANCE

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CROSS-REFERENCE TO RELATED APPLICATIONS

Not Applicable

STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT

Not Applicable

REFERENCE TO SEQUENCE LISTING, A TABLE, OR A COMPUTER PROGRAM LISTING COMPACT DISK APPENDIX

Not Applicable

CROSS-REFERENCE TO RELATED APPLICATIONS

U.S. Application No: 10/761,504 (Title: Windshield Heating Air Appliance)

REFERENCE TO SEQUENCE LISTING, A TABLE, OR A COMPUTER PROGRAM LISTING COMPACT DISK APPENDIX

Not Applicable

BACKGROUND OF THE INVENTION

1. Field of the Invention

- [1] The present invention is directed to devices designed to accomplish the following tasks:
- (1). To prevent fogging of the automobile windshield.
 - (2). To enhance thawing of accumulated ice on the automobile windshield.
 - (3). To reduce fogging of the automobile front side windows

2. Prior Art

- [2] Fogging is caused by condensed water vapor collecting on a glass surface due to the difference in temperature between the glass surface and the adjacent air. Warmer air inside an automobile in contact with the windshield and side window surfaces will be cooled down, the cooling of this air reduces its ability to retain moisture, and thus the moisture that is released condenses on the inside windshield and side window surfaces. There are two different climate conditions in which fogging of the windshield and side windows occur even though the automobile have a ventilation system. First, in a cold climate, it occurs when the temperature inside automobile differs significantly from the temperature outside. Secondly, in a wet climate such as a rainy day, it occurs when air humidity inside the automobile is very high and the rain and wind keep the windshield and side windows cooler than air inside the automobile. When fogging of the windshield and side windows occurs, it significantly reduces the driver visibility through the windshield and front side windows, greatly increases the risk of traffic accidents.
- [3] Also, in a cold climate, an automobile cannot be operated until ice accumulated on the windshield is melted and removed. To melt ice, it requires time to preheat the automobile passenger compartment.
- [4] Currently, there is not a simple, economic approach that can effectively address the driving safety concern related to fogging of the windshield and front side windows in a wet or cold climate. On the other hand, there is not a simple, economic and effective way to quickly melt ice accumulated on the windshield in a cold climate. Therefore, it is the objective of the present invention to create a simple and economic solution to address the above issues effectively so that automobile industry will adapt the solution to make driving safer and easier in a wet or cold climate. The characteristics of the present invention will become apparent in light of the present specification, including claims, and drawings.

BRIEF SUMMARY OF THE INVENTION

- [5] It is an object of the present invention to prevent fogging of the windshield in a wet or cold climate, thereby to improve driving safety in a wet or cold climate.
- [6] Another object of the present invention is to speed up melting ice accumulated on the windshield in a cold climate so that an automobile can be operated soon after its engine warmed up.

- [7] Still another object of the present invention is to reduce fogging of the front side windows in a wet or cold climate to enhance driving safety.
- [8] According to the present invention, the windshield heating air appliances and dashboard air vent cover are made of transparent plastic or other transparent material as Figure 1, Figure 12, and Figure 14 illustrated. The windshield, windshield heating air appliance, and either dashboard or dashboard air vent cover form a complete assembly henceforth referred as controlled heating air space that is shown in Figure 7 and Figure 15. The controlled heating air space can be quickly heated, the windshield surface can be maintained at an optimal temperature to prevent fogging of the windshield in a wet or cold climate, reducing the time required to melt ice accumulated on the windshield in a cold climate.
- [9] According to the present invention, the front side window cover is made of transparent plastic or other transparent material as Figure 18 and Figure 19 illustrate; since air is a poor thermal conductor, an additional insulation layer, formed by the front side window cover and air inside of the front side window cover, keeps the front side window cover temperature close to the internal automobile passenger compartment temperature; therefore, effectively reduces fogging of the front side windows in a wet or cold climate.
- [10] The present invention has the following major advantages:
- It provides a single solution to address multiple issues, which includes preventing fogging of the windshield, reducing fogging of the front side windows, and reducing time required to melt ice accumulated on the windshield.
 - The windshield heating air appliance and front side window cover are inexpensive.
 - It does not require any change in the automobile design.
 - It does not consume automobile passenger compartment usable room.
 - Its installation is simple and easy.

BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWING

- [11] The foregoing summary and the following detailed description may be better understood when read in conjunction with the accompanying drawings. Various embodiments are shown for the purpose of illustrating the invention. It is understood, however, that this invention is not limited to the precise arrangements shown.

- [12] Figure 1 shows a front view of the first windshield heating air appliance; Angle B of the dashboard support and the length of edges X and Y may vary based on size and position of the air vents. The windshield heating air appliance is attached to the windshield surface through the top, left, right, and bottom edges.
- [13] Figure 2 shows a back view of the first windshield heating air appliance; the dashboard support edges are attached to the dashboard surface.
- [14] Figure 3 shows a front view of the first windshield heating air appliance, dashboard, and dashboard air vents; the dashboard air vents are located between the windshield and windshield heating air appliance.
- [15] Figure 4 shows a back view of the first windshield heating air appliance, dashboard, and dashboard air vents; the air vents are located between the windshield and windshield heating air appliance.
- [16] Figure 5 shows shaded surfaces of the first windshield heating air appliance which are designed to be attached to the windshield surface.
- [17] Figure 6 shows shaded dashboard support edge surfaces which are designed to be attached to the dashboard surface.
- [18] Figure 7 shows that the windshield surface is represented by the solid thick line, the first windshield heating air appliance surface is represented by the thin dashed line, the dashboard surface is represented by hatched lines at the bottom of the figure; this completes an assembly referred as controlled heating air space which consumes less than 2% of the entire automobile passenger compartment.
- [19] Figure 8 shows a front view of the first windshield heating air appliance with a rear view mirror base path on the top.
- [20] Figure 9 shows a back view of the first windshield heating air appliance with a rear view mirror base path on the top.
- [21] Figure 10 shows a view of the first windshield heating air appliance with L edges.
- [22] Figure 11 shows that the first windshield heating air appliance composed of two symmetric parts, which are joined together during the installation, to facilitate shipping.
- [23] Figure 12 shows a front view of the second windshield heating air appliance design, which has L edges on all four sides and a pipe connector on its bottom.
- [24] Figure 13 shows a back view of the second windshield heating air appliance design, which has L edges on all four sides and a pipe connector on its bottom.

- [25] Figure 14 shows a view of the dashboard air vent cover with a male pipe connector; the dashboard air vent cover is a part of the second windshield heating air appliance, its male pipe connector joins the female pipe connector from the windshield heating air appliance to supply heated air for the controlled heating air space.
- [26] Figure 15 shows that the windshield and second windshield heating air appliance together assemble a controlled heating air space which consumes less than 1% of the entire automobile passenger compartment; thin dashed lines represent the windshield heating air appliance surface, thick dashed lines represent the windshield surface; the female pipe connector from the second windshield heating air appliance joins the male pipe connector from the dashboard air vent cover to provide heated air for the controlled heating air space.
- [27] Figure 16 shows T edge sizes for the first windshield heating air appliance, where T edge height is 1.5 inches and T edge width is 1.0 inches, the dashboard support edge size is 0.8 inches wide.
- [28] Figure 17 shows L edge sizes for both windshield heating air appliances, where the height is 1.5 inches and the width is 0.8 inches.
- [29] Figure 18 shows a view of the front side window cover.
- [30] Figure 19 shows an isometric view of the front side window cover.
- [31] Figure 20 shows edge sizes of the front side window cover.
- [32] Figure 21 shows a view of the first windshield heating air appliance equipped with two windshield-tinting plastics; two shaded surfaces represent two windshield-tinting plastics pulled out from the two windshield-tinting devices.
- [33] Figure 22 shows that a windshield-tinting device is shown in A; the windshield-tinting plastic is attached to a hard handle on the right as shown in B; two handle holders attached to the windshield heating air appliance shown in C are used to lock the windshield-tinting plastic handle.
- [34] Figure 23 shows an isometric view of the windshield heating air appliance.

DETAILED DESCRIPTION OF THE INVENTION

- [35] According to the present invention, the windshield heating air appliances are made of the transparent plastic or other transparent materials. For the windshield heating air appliance

in Figure 1, its top, left, right and bottom shaded edges in Figure 5 are designed to be attached to the windshield, the shaded dashboard support edges in Figure 6 are designed to be attached to the dashboard; the dashboard air vents in Figure 3 and Figure 4 are located between the windshield and the first windshield heating air appliance; the windshield heating air appliance, windshield, and dashboard form a complete assembly henceforth referred as controlled heating air space. For the windshield heating air appliance in Figure 12, its top, bottom, left and right L edges are designed to be attached to the windshield; its female connector is designed to join the male connector on the dashboard air vent cover to obtain hot air supplied; the windshield, windshield heating air appliance, and dashboard air vent cover assemble a controlled heating air space. Utilizing heated air supply from the dashboard air vents, air in the controlled heating air space can be quickly heated up, and the internal windshield surface can be maintained at an optimal temperature; thus the heated windshield surface no longer causes the adjacent air reducing ability to retain moisture, prevents fogging of windshield, ensures the best driving visibility in a wet or cold climate.

- [36] Furthermore, the controlled heating air space can maintain the windshield surface at a relatively high temperature in a very cold climate, this can prevent the windshield from a dangerous "flash freeze" situation which may occur when water at or near freezing point strikes a relatively cool windshield while it is in motion, such as when cold water is splashed up onto a car windshield by a passing tractor-trailer.
- [37] According to the present invention, the front side window cover is made of transparent plastic or other transparent material; since air is a poor thermal conductor, the air temperature between the front side window and the front side window cover is always higher than the front side window temperature in a wet or cold climate; therefore an additional insulation layer, formed by the front side window cover and the air inside the front side window cover, enhances the front side window insulation, keeps the front side window cover temperature close to the inside passenger compartment temperature; therefore significantly reduces fogging of the front side window in a wet or cold climate.
- [38] When an automobile is parked in a parking lot or on the street in a cold climate, the normal practice to melt ice on the windshield is to preheat the automobile passenger compartment. Since the controlled heating air space consumes less than 2% of an automobile passenger compartment, it takes much less time to heat up the controlled

heating air space compared to the entire automobile passenger compartment; thus shorter time to melt ice accumulated on the windshield saves time and reduces pollution.

- [39] Some automobile models have the rear view mirror base attached to the ceiling. Other automobiles have the rear view mirror base attached to the windshield. To accommodate the rear view mirror base attached to the windshield, the windshield heating air appliance shown in Figure 8 and Figure 9 has an open path to fit the rear view mirror.
- [40] The windshield-tinting device is another feature of the windshield heating air appliance. A rotatable windshield-tinting device as shown in Figure 22 is designed for simplicity. To use the windshield-tinting device when driving on a sunny day, pull out the windshield-tinting plastic hard handle and lock the hard handle into the two handle holders on the windshield heating air appliance as shown in Figure 21. To put away the windshield-tinting plastic, release the hard handle from the handle holders, the rotatable windshield-tinting device automatically rotates the windshield-tinting plastic out of view.